

REMARKS

Applicants respectfully request reconsideration and allowance in view of the foregoing amendments and following remarks. In the Office Action, mailed January 09, 2004, the Examiner rejected claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35. Following entry of this response, claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35 will be pending in the application.

General Discussion of Examiner's "Response to Arguments"**Claim 29**

In rejecting Applicants' prior Office Action response argument that Clarke et al. (U.S. Patent No. 5,781,847) do not teach being adapted to digitally shift the digital data in frequency, the examiner first cites C3:15-30 of '847, which reads:

The detector circuit may comprise a mixer as well as a frequency discriminator. Other components such as amplifiers, filters and pre-scalers may optionally be included. The mixer may be coupled to the sampler and serve for mixing a stable reference with the sample and thereby generating a frequency signal which comprises any error in the microwave frequency of the channel signal from its desired microwave frequency. The frequency discriminator may be coupled between the mixer and the input circuit and serve for providing the corrective signal for regulating the microwave frequency of the source in accordance with the frequency signal generated by the mixer. The stable reference and at least the frequency discriminator of the feed-back loop may be common to the group of channels.

and next cites C5:10-34 of '847, which reads:

... The error detector circuit is coupled between the sampler antenna 41 and the input circuit 13,24 at the input of the source 12. This detector circuit 39,29 serves for detecting any drift or other error in the carrier frequency F of the sample from the desired microwave frequency for that channel signal and for providing a corrective signal to the input circuit 13,24.

Also in accordance with the present invention, the part of the feed-back loop 20,40 comprising the detector circuit formed by elements 39,29 is common to a group of the channels. Switch means formed by elements 28,38 (see FIGS. 1 and 2) are present in the feed-back loop 20,40 for coupling the common part of the feed-back loop between the sampler antenna 41 and the source input circuit 13,24 of each channel and for permitting this common part to be time multiplexed

between the respective feed-back loops of the group of channels. The input circuit (13a,24a),(13b,24b), . . . for each source 12a,12b . . . applies a control signal regulating the frequency Fa,Fb . . . of the source 12a, 12b . . . in accordance with the last corrective signal AFC generated by the detector circuit 39,29 for that source. Thus, the feed-back loop 20,40 is used to monitor the channel frequency Fa,Fb . . . of each oscillator source 12a, 12b . . . and to regulate the operation of the source 12a, 12b . . . so controlling its frequency Fa,Fb . . .

The Examiner then represents that Clarke et al. teach, in these cited passages, that the "correction of the drift in the carrier frequency F of the sample is referred to being adapted to 'digital [sic] shift the data in frequency.'"

However, nowhere is a digital modification of a digital signal taught in Clarke et al. In fact, as illustrated at C9:62-C10:16 of '847, Clarke et al. only teach a multiplexed analog control for the varactor-tuned Gunn oscillator.

... This AFC signal includes as a component a measure of any frequency drift in the transmitted channel frequency Fa,Fb . . . for the selected channel a,b The AFC voltage signal is output from the receiver 39 on line 39a which is connected to an input of the AFC process unit 29. The AFC signal on the line 392 is a standard quality output voltage from the frequency discriminator of the indoor receiver 39. The process unit 29 serves to process this standard AFC voltage by filtering and amplification so that the AFC signal is suitable for summation with the channel voltages in the programming offset circuits 24a,24b, . . . Thus, the feed-back loop 20,40 of FIG. 1 for stabilising the channel frequency Fa,Fb, . . . of each respective source 12a, 12b, . . . comprises a common sampler antenna 41, a common down-converter unit 40, a common UHF IF receiver 39, a common AFC process unit 29, a respective channel programming offset circuit 24a,24b, . . . for each channel and a respective clamp circuit 13a,13b, for each channel . . . A UHF RF tuner 38 and a decoder 28 (both controlled by the microcontroller sequencer 21) form the time-multiplex switching means for the common parts of the feed-back loop 20,40.

It is not disputed that both the Clarke et al. system and Applicants' invention represent, at a macro level, a means for ultimately receiving digital data and ultimately transmitting digital data. However, the method of correcting frequency offsets differs significantly between Applicants' invention and the Clarke et al. system. Applicants' claimed invention performs frequency shift by digital modification of a digital representation of the digital data-containing baseband signal as specified in independent claim 29.

Applicants' technique is illustrated, for example, in Fig. 3, wherein the following from Applicants' specification (at p. 10, 1st para.) describes the process and digital nature of the signals:

... From there, the assembled data is digitally shifted in frequency by block 304 using the carrier offset information detected by the receiver in FIG. 2. The shifted digital data is then converted to analog by DAC 306 and transmitted by transmitter 308.

(emphasis added).

Applicants thus have "digital data" being "digitally shifted," something neither taught nor suggested by the '847 patent.

Claim Rejections under 35 U.S.C. § 112 (First Paragraph)

In the Office Action, the Examiner rejected claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35 under 35 U.S.C. §112, first paragraph, for allegedly failing to comply with the written description requirement. Applicants respectfully traverse the rejections of claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35.

A rejection under 35 U.S.C. §112, first paragraph, is not appropriate when "those skilled in the art would understand what is claimed when the claim is read in light of the specification."

Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576 (Fed. Cir. 1986). In the Office Action, the Examiner asserts that claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35 contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Specifically, the Examiner alleges that the recitation of "using one of OFDM, NBFDM, DMT, FDMA and TDMA" to the exclusion of CDMA is new matter (see, Office Action, page 4, item 3).

Applicants affirmatively state in numerous locations throughout the specification as filed, that Applicants' invention is equally operative for OFDM systems, DMT systems, multiple antenna systems, FDMA systems, narrow-band FDMA systems, or TDMA systems, as well as CDMA systems. For example, beginning at p. 7, line 17 and continuing through p. 8, line 3, Applicants disclose:

Although the invention is particularly useful for CDMA modulation techniques, the invention is not limited to this example, but should be particularly useful for many other modulation techniques where frequency offsets can introduce difficulties such as multi-user detection systems employing antenna diversity or smart antennas. In fact, any modulation or diversity schemes that rely on accurate frequency and/or time resolution can benefit from this invention, which include, but not limited to, previously mentioned OFDM systems, discrete multiple tone (DMT) systems, multiple antenna systems, narrow-band FDMA systems, or TDMA systems.

Further, on p.18, lines 5-13, Applicants state:

Moreover, other embodiments of the invention are possible. For example, the transmitter-corrected frequency offset scheme can be applied to any digital communication system for better performance or lower-cost implementations. It is especially suited for applications that explore diversity to facilitate multiple access. Some such examples are multi-user detection systems employing antenna diversity or smart antennas, multi-carrier OFDM, DMT, etc. This invention allows the transmitted signals from multiple sources to be frequency-locked to the receiver, so that the signals from multiple sources are synchronized in both frequency and time.

Applicants' claimed inclusion of some enabled aspects of the invention to the exclusion of other enabled aspects does not equate to new matter. For at least the foregoing reasons, the §112, first paragraph, rejections of claims 1, 2, 4, 5, 8, 9, 15, 16, 18, 19, 22, 23, 29, 31, 34 and 35 should be withdrawn.

Claim Rejections under 35 U.S.C. §102

In the Office Action, the Examiner rejected claim 29 under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,781,847 to Clarke, et al. ("Clarke") and claims 1, 2, 4, 5, 8, 15, 16, 18, 19, 22, 34 and 35 under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 5,982,809 to Liu, et al. ("Liu"). Applicants respectfully traverse the rejections of claims 1, 2, 4, 5, 8, 15, 16, 18, 19, 22, 29, 34 and 35.

A claim is anticipated under 35 U.S.C. §102 "only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1570 (Fed. Cir. 1988) (emphasis in original), cert. denied, 488 U.S. 892 (1988).

For at least the reasons stated below, Applicants assert that both Clarke and Liu fail to expressly or inherently describe each and every element of the invention claimed by Applicants and, therefore, that Applicants' rejected claims 1, 2, 4, 5, 8, 15, 16, 18, 19, 22, 29, 34 and 35 are patentably distinct from Clarke and Liu.

Independent Claim 29

Applicants' independent claim 29, as amended, recites a device adapted to be used in a first unit that can communicate with a second unit using a common carrier frequency that includes:

a frequency lock loop that is coupled to receive a digital representation of a first signal transmitted by the second unit, the frequency lock loop being adapted to detect a carrier frequency offset in the first signal and to produce offset information corresponding thereto; and

a frequency shift block that is coupled to receive the offset information and digital data to be transmitted by the first unit in a second signal to be received by the second unit, the frequency shift block being adapted to digitally shift the digital data in frequency in accordance with the common carrier frequency and the carrier frequency offset so that the effects of the carrier frequency offset to be perceived by the second unit will be substantially reduced.

Clarke neither discloses nor suggests a device that includes a frequency shift block being adapted to digitally shift the digital data in frequency in accordance with a common carrier frequency and the carrier frequency offset as required by independent claim 29.

In asserting anticipation of the invention as claimed in independent claim 29, the Examiner refers to Figures 1 & 3 of Clarke, as well as col. 5, ll. 12-15; col. 5, ll. 26-34; col. 7, ll. 17-23; and col. 11, ll. 22-60, of Clarke. These citations of Clarke illustrate creating offset voltages that both tune an analog VCO to adjust for frequency offset and for channel selection. Clarke does not disclose or suggest the subject matter of amended independent claim 29 for at least the following reasons.

Clarke nowhere discloses a device that digitally shifts the digital data in frequency as required by amended independent claim 29. Rather, Clarke discloses creating offset voltages that both tune an analog VCO to adjust for frequency offset and for channel selection. Clarke states that "the operational amplifier 13a,13b ... applies to the input of its respective source 12a, 12b ... the bias signal V_b for regulating the frequency of the source in accordance with the last corrective

signal generated by the frequency discriminator 60 for that source 12a, 12b ..." (see Clarke, col. 11, ll. 56-61). In contrast, Applicants' claimed invention performs frequency shift by digital modification of the digital data-containing baseband signal as specified in amended independent claim 29.

Therefore, for at least these reasons, Clarke neither discloses nor suggests a device that includes a frequency shift block being adapted to digitally shift the digital data in frequency in accordance with a common carrier frequency and the carrier frequency offset as required by independent claim 29. Accordingly, Applicants respectfully submit that amended independent claim 29 is allowable over the art of record.

Independent Claims 1, 15, 34 and 35

Applicants' independent claims 1, 15, 34 and 35, as amended, recite, *inter alia*, a method and devices used in a communication system, where the communication is a OFDM, NBFDM, DMT, FDMA or TDMA system, in which a first unit communicates with a second unit using a common frequency where: initially, the first unit transmits a first signal to the second unit from which the second unit detects an offset between the common frequency used for the first signal and its own used common frequency; then, the second unit adjusts its own common frequency using the previously-determined reception offset for transmitting a second signal back to the first unit.

Liu neither discloses nor suggests a method and devices as required by amended independent claims 1, 15, 34 and 35 for at least the following reasons.

Liu nowhere discloses a OFDM, NBFDM, DMT, FDMA or TDMA communication system as required by amended independent claims 1, 15, 34 and 35. Liu discloses a method and device used in a spread-spectrum CDMA communication system. As is known in the art, the CDMA protocol is not the same as, nor obvious over, a communication system that uses OFDM, NBFDM, DMT, FDMA or TDMA. Further, a system, such as Lui, that is optimized for CDMA is neither readily nor easily adapted to perform functions in the other communication systems. In contrast, Applicants' invention requires that the first unit and the second unit communicate within the OFDM, NBFDM, DMT, FDMA or TDMA communication system over a common frequency.

For at least this reason, Liu neither discloses nor suggests a method and devices as required by amended independent claims 1, 15, 34 and 35. Accordingly, Applicants respectfully submit that

independent claims 1, 15, 34 and 35 are allowable over the art of record.

Dependent Claims 2, 4, 5, 8, 16, 18, 19 and 22

Dependent claims 2, 4, 5, 8, 16, 18, 19 and 22 all ultimately depend from one of amended independent claims 1 and 15. The allowability of dependent claims 2, 4, 5, 8, 16, 18, 19 and 22 thus follows from the allowability of amended independent claims 1 and 15; as such, for at least this reason, dependent claims 2, 4, 5, 8, 16, 18, 19 and 22 are allowable over the art of record.

Claim Rejections under 35 U.S.C. §103(a)

In the Office Action, the Examiner rejected claims 9 and 23 under 35 U.S.C. §103(a) as allegedly being unpatentable over Lui in view of U.S. Patent No. 5,805,029 to Theus et al. (hereinafter, "Theus"). Further, the Examiner rejected claim 31 under 35 U.S.C. §103(a) as allegedly being unpatentable over Clarke in view of Theus. Applicants respectfully traverse the rejections of claims 9, 23 and 31.

Dependent Claims 9 and 23

Dependent claims 9 and 23 ultimately depend from amended independent claims 1 and 15, respectively. The allowability of dependent claims 9 and 23 thus follows from the allowability of amended independent claims 1 and 15; as such, for at least this reason, dependent claims 9 and 23 are allowable over the art of record.

Independent Claim 31

Applicants assert the reasons stated above, in relation to independent claim 29, as reasons why Clarke is also inapplicable to independent claim 31. Therefore, one of ordinary skill in the art would not have considered Applicants' invention obvious at the time of invention and, therefore, Applicants' rejected independent claim 31 is not obvious over the art of record.

For at least these reasons, Applicants respectfully submit that claims 9, 23 and 31 are allowable over the art of record.

Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition of allowance and a Notice to that effect is earnestly solicited. If

09/416,098 to Meng, et al.

any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

CHARGE STATEMENT: The Commissioner is hereby authorized to charge fees that may be required relative to this application, or credit any overpayment, to our Account 03-3975, Order No. 073169-0259697 (ATH-005).

Respectfully submitted,
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